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Forest Service
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Reply To: 3420

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Subject: Evaluation of white fir seedlings at Jawbone Progeny Test Site (FPM Report C93-11)

To: Ann Denton, Mi-Wok District Ranger

On June 25, 1993, John Pronos, forest pathologist, and Sheri Smith, forest entomologist, visited the Jawbone Progeny Test Site (T.2 N., R.18 E., Sec. 14) with Carmen Galvan from the Mi-Wok District. This Progeny Test Site is located on the Groveland RD, but is managed by the Mi-Wok RD and Regional Tree Improvement Program (TIP) personnel. Injured seedlings and tree mortality observed this spring prompted District personnel to contact TIP. TIP advised the District to request a biological evaluation from Forest Pest Management (FPM). The objective of the field visit by FPM was to determine if insects and/or pathogens were associated with the seedling injury and mortality.

Background and Observations

The Jawbone Progeny area is located at an elevation of 6200 feet in the mixed conifer type. The 6-acre site was planted with white fir in 1990. Management of this site has included baiting for pocket gophers twice and hand releasing the seedlings twice.

In approaching the site we noticed that the fence was down in many areas and intact stumps were scattered among the seedlings. The majority of seedlings were stunted and looked like small bushes. Current or recent mortality was not extensive however most trees appeared to have some type of damage. Of the few seedlings with good height growth most had distorted leaders. Tree heights varied between 6 inches and 3 feet. Heights of 14-16 inches were the most common.

An examination of many seedlings revealed a combination of problems associated with there appearance. The list below summarizes our observations:

1. The foliage of many seedlings had evidence of damage from browsing and/or pocket gopher feeding. Repeatedly damage and death of new growth and buds has caused an increase in the formation of lateral buds. FPM personnel recommended that an animal damage specialist from the RO examine the Progeny seedlings to determine the cause and impact of this damage. If the damage is due to browsing, the fence should be repaired to minimize access.

2. Several dead firs were excavated to examine their root systems. Typically, the roots on these trees were poorly developed, with lateral roots growing straight down in a narrow column rather that flaring

out. It was not clear if this was caused by growing in containers or by the planting process.

3. The majority of dead seedlings we examined had been killed by below ground girdling of roots by pocket gophers.

4. Brown felt blight, a fungus disease that develops under snow and kills needles, was present on trees growing in the lower portions of the site. Although this disease is not a major problem throughout the area, it is reducing the live crown of affected trees and probably also reducing growth.

5. Several large white fir stumps from the original stand had patterns and characteristics of decay caused by annosus root disease. This is not confirmation that annosus is present, but if seedlings begin to die adjacent to white fir stumps during the next 3-5 years, it could be due to root disease. We recommend removing all stumps from progeny test sites prior to planting, to minimize potential root disease problems.

6. Two types of aphids were found infesting some of the seedlings - the giant conifer aphid and balsam twig aphid (sample sent to U.C. Davis for confirmation). The few giant conifer aphids, Cinara spp., found on individual trees were not enough to cause noticeable damage. The new growth on some seedlings was infested with balsam twig aphid, Mindarus abietinus. Extensive damage was not noticed during this field visit, however continuous feeding can cause the needles to become distorted and/or drop off prematurely.

Conclusions/Management

Insects and pathogens are not playing a significant role in recent seedling injury and death. Control of the aphids is not currently warranted, and there are no established or proven treatments for brown felt blight. Most damage to the white fir appears due to vertebrate pests, site conditions, suitability of stock, and perhaps poor planting techniques. Much of this injury could have been prevented. An animal damage specialist will have to provide direction on the need for treatment.

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